

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
7 July 2005 (07.07.2005)

PCT

(10) International Publication Number  
**WO 2005/060657 A2**

(51) International Patent Classification: Not classified

(21) International Application Number:  
PCT/US2004/042200

(22) International Filing Date:  
15 December 2004 (15.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/529,676 15 December 2003 (15.12.2003) US

(71) Applicant (for all designated States except US): YALE  
UNIVERSITY [US/US]; Two Whitney Avenue, New  
Haven, CT 06511 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): AHN, Charles  
[US/US]; 15 Prospect Street, New Haven, CT 06520-8284  
(US). KLEIN, Lior [IL/IL]; Ma'aleh Hazofim 9, 52488  
Ramat-Gan (IL). BASSON, Yosef [IL/IL]; Ha'amakim  
63, 55900 Ganey Tiqva (IL). HONG, Xia [CN/US]; 420  
Temple Street, Room 308, New Haven, CT 06511 (US).  
YAU, Jen-Bang [—/US]; 760 Mix Avenue, Apt. 2B,  
Hamden, CT 06514 (US).

(74) Agent: SCHAIER, Arthur, G.; Carmody & Torrance  
LLP, 50 Leavenworth Street, P.O. Box 1110, Waterbury,  
CT 06721-1110 (US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv)) for US only

**Published:**

— without international search report and to be republished  
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: MAGNETOELECTRONIC DEVICES BASED ON COLOSSAL MAGNETORESISTIVE THIN FILMS

(57) Abstract: The present invention is directed to the use of perovskite manganite thin films and other magnetic films that exhibit both planar Hall effect and biaxial magnetic anisotropy to form the active area in magnetic sensor devices and in magnetic bit cells used in magnetoresistive random access memory (MRAM) devices. The manganite thin films of the invention are ferromagnetic manganites of the formula  $R_{1-x}A_xMnO_3$ , wherein R is a rare-earth metal, A is an alkaline earth metal, and x is generally between about 0.15 and about 0.5.



WO 2005/060657 A2